A Drug Map of the World

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The National Wholesale Druggists' Association has recently published a drug map of the world, by Edwin L. Newcomb, measuring about three by five feet, and intended to be displayed in drug store windows during "National Pharmacy Week" (the third week in October). The map shows the approximate source of about 225 standards drugs, by means of their names inserted at the proper places. The drugs named are nearly all crude drugs of vegetable origin, "official" (officinal) in the United States Pharmacopeia or the National Formulary. No inorganic products, and only three or four of animal origin, are included. There are also three which might be said to belong to both the vegetable and animal kingdoms, namely, nut-galls, and white and yellow wax (the two last being different forms of beeswax).

There are of course all gradations between the most important vegetable drugs and those which are of imaginary value or inert, and the number officially recognized varies in the pharmacopoeias of different countries and in the same country at different times, with a tendency to reduce the number from time to time as synthetic products and surgical processes are substituted for the old herb medicines. New discoveries in medicinal plants are rare, and most of our vegetable drugs have been known for a century or more, and some since pre-historic times.

In some cases two or more different drugs are yielded by the same plant, or the same drug may appear in the trade in different forms, such as powder, tincture, oil, etc. On the other hand, the same drug or its equivalent may come from either of two or more related species, and occasionally from different genera or families.[1] Although Dr. Newcomb's selection includes some drugs which are no longer in the U. S. Pharmacopoeia, but may still be articles of commerce, and omits several officinal plants (perhaps because there was not room for them all on the map), such discrepancies may not seriously affect the following generalizations.

[1] Two striking cases of this are anise, from *Pimpinella Anisum* of Europe and *Illicium verum* of eastern Asia, and storax, formerly derived from *Styrax officinalis* of western Asia (said to be now nearly extinct), and now from two species of *Liquidambar*.

The first glance at the map shows that drug plants are very unevenly distributed over the earth. It is not surprising that they are scarce or absent in arctic regions and deserts, and in other sparsely settled regions where there are few persons who can identify and gather them. On the other hand, there is a marked concentration of them in many mountainous regions. This may be mostly because mountain regions generally retain much of their original wild flora, and most medicinal plants which may have originally inhabited fertile plains have given way to cultivated crops. Another possibility is that the soil has something to do with it. For some reason not understood, medicinal plants seem to be rather partial to climax vegetation with abundant humus, and scarce in acid soils (there are few or none among the bryophytes, and in such acid-loving families as the Cyperaceae, Juncaceae, Orchidaceae, Hypericaceae and Ericaceae), and perhaps also in alkaline soils (preferred by such families as the Chenopodiaceae, Cactaceae, Onagraceae, Borraginaceae and Ambrosiaceae). If they really avoid alkaline soils that may explain why they are much more numerous in the eastern than in the western United States. Mountains on the whole seem to have soils neither acid nor alkaline, but approximately neutral.

If we interpret the tropics mathematically as that portion of the earth within $23\frac{1}{2}$ degrees of the equator, 159 of the drug plants mapped by Dr. Newcomb come from the North Temperate zone, 59 from the tropics, and only 5 from the South Temperate zone. Only a few are common to temperate and tropical regions. Dividing them by continents and smaller divisions, we find that Canada has 17, the eastern United States 88, western United States 14, Mexico and Central America 13, the West Indies 11, South America 24, Europe 69, western Asia 24, eastern Asia 40, Africa 29, and Australia and Polynesia 5. This grouping of course involves more duplication than the zonal one, for several species are common to different continents, or native in one and introduced or cultivated in another. Of those in the eastern United States, 62 are pretty certainly native, 16 are usually weeds, and 10 cultivated. Information is lacking as to the status of those in other countries, but they are probably mostly native also; for it is not usually profitable to cultivate a plant for medicinal purposes as long as the same species

is common somewhere in the wild state.[2] (Some plants which are cultivated for food or fiber, such as corn and cotton, do indeed yield medicinal products also; but those are by-products, and plant breeders usually emphasize one particular quality in a plant, and any other is only incidental.)

If we study the representation of different families in the medicinal flora of the world we find some interesting variations. The families most largely represented in Dr. Newcomb's list are Leguminosae (including Mimosaceae, Caesalpiniaceae and Fabaceae, for these families are not usually separated in the literature of pharmacy), Compositae (Carduaceae), Umbelliferae, Solanaceae, Liliaceae (including Melanthaceae, etc.), Zingiberaceae, Ranunculaceae, Rutaceae, Rosaceae (including Amygdalaceae, etc.), Labiatae (Nepetaceae), Rubiaceae, Gramineae (Poaceae), Malvaceae, Cucurbitaceae, Piperaceae, Cupuliferae (Fagaceae), Lauraceae, Menispermaceae, Loganiaceae, Rhamnaceae, Gentianaceae, Iridaceae, Berberidaceae, and Caprifoliaceae (each of these including at least three medicinal species). But if we consider the ratio of medicinal plants to total number of species, the sequence would be quite different, and some small families might outrank the Leguminosae and Compositae.

There is of course a vast difference in the families represented in the temperate and tropical floras. The leading drug plant families in the North Temperate zone seem to be Compositae, Umbelliferae, Leguminosae (etc.), Solanaceae, Labiatae, Malvaceae, Rutaceae, Cucurbitaceae, Berberidaceae, Rhamnaceae, Cupuliferae, Gentianaceae, Rosaceae, and Caprifoliaceae; and in the tropics Leguminosae (etc.), Piperaceae, Rubiaceae, Zingiberaceae, Menispermaceae, Simarubaceae, Myrtaceae, Sterculiaceae, Loganiaceae, Solanaceae, and Rosaceae.

In the North Temperate list there are 3 algae, 2 fungi, 1 lichen, 2 pteridophytes, 4 conifers, and 19 monocotyledons. The tropical drug plants are all angiosperms, and only 8 of them monocotyledons; though the proportion of monocotyledons is about 13% in both zones.[3]

[2] Report upon the Cultivation of Drug and Dye Plants, H. H. Rusby, Journal of the New York Botanical Garden **16**, 155, Aug. 1915.

The Outlook for Drug Culture in North America, H. H. Rusby, Columbia University Quarterly, **19**: 7–14, Dec. 1916.

[3] See Torreya **5**: 207–210. (Jan. 1906).

By size, etc., the drug plants of temperate regions may be classed as follows:—Large trees 16, small trees 10, woody vines 2, shrubs 25, herbs 100, and cellular cryptogams (thallophytes) 6. In the tropics 25 are trees (large or small), 5 woody vines, 11 shrubs, and 11 herbs, according to the best information available at this writing.

The parts used vary considerably too in different zones. Among the vegetable drugs mapped in the North Temperate zone, whole plants (sometimes excluding roots) contribute 15, roots, rhizomes, tubers and bulbs 53, twigs 1, juice, gum or resin 12, bark of stem 15, bark of root 4, leaves (and tops) 25, flowers and parts thereof (and buds) 11, drupes, berries, and other fleshy fruits (including rind, pulp, or juice) 15, and dry fruits, achenes, seeds and spores 17. In the tropics, roots and rhizomes contribute 11 of our drugs, stems or wood 3, gum, juice, or wood extract (including powder in wood) 13, bark 5, leaves (and twigs) 7, flowers and parts thereof 2, fleshy fruits 7, and dry fruits and seeds 8.

An analysis of the chemical or therapeutic properties of all these drugs by zones, countries, families, plant parts, etc., would doubtless also show some interesting contrasts, but would be a much more difficult matter, for many drugs have several different properties, some more important than others. But such a study might very well be made by some one studying the medicinal flora of a single state or other limited area. Probably as many as half of the drug plants in the United States can be found in any one of several eastern states.

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